AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1-40. (Canceled)

41. (Currently Amended) A method of tuning a spatial separation between a first optical port of an optical circulator and a third optical port of the optical circulator comprising:

providing the optical circulator, and the optical circulator having a longitudinal axis, and the optical circulator comprising a first optical port located at an end of the optical circulator, a second optical port located at a distal end of the optical circulator from the first optical port along the longitudinal axis, and a third optical port located at the same end of the optical circulator as the first optical port;

passing a first optical beam from the first optical port to the second optical port, wherein the first optical beam enters the optical circulator from the first optical port at an angle to the longitudinal axis such that the first optical beam diverges from the longitudinal axis, passing a first optical beam further comprising:

turning the first optical beam towards the longitudinal axis with a first beam angle turner; and

turning the first optical beam with a second beam angle turner such that the first optical beam is aligned with the longitudinal axis of an imaging element for the second optical port, wherein the first beam angle turner is separated from the second beam angle turner by a complete gap;

passing a second optical beam from the second optical port to the third optical port, wherein the second optical beam enters the optical circulator from the second optical port aligned with the longitudinal axis, passing the [[a]] second optical beam further comprising:

turning the second optical beam with the second beam angle turner such that the second optical beam diverges from the longitudinal axis; and

turning the second optical beam with the first optical beam turner back towards the longitudinal axis; and

adjusting a length of the complete gap causing a corresponding adjustment in a spatial separation between the first optical beam and the second optical beam, wherein the location of the first light beam and the second light beam define the location of the first optical port and the third optical port.

42. (Previously Presented) The method of claim 41, wherein the first beam angle turner or second beam angle turner comprises a Rochon prism, a Wollaston prism, a modified Rochon prism, a modified Wollaston prism, or a pair of birefringent wedges separated by a complete gap.

43. (Previously Presented) The method of claim 41, wherein each of the first beam angle turners or second beam angle turners comprise two or more Rochon prisms, Wollaston prisms, modified Rochon prisms, modified Wollaston prisms, or a pair of birefringent wedges separated by a complete gap.

44. (Previously Presented) The method of claim 41, wherein the optical circulator comprises a polarization mode dispersion free optical circulator.

45. (Previously Presented) The method of claim 41, wherein passing a first optical beam from the first optical port to the second optical port further comprises separating the first optical beam into a first polarization and a second polarization, and wherein passing a second optical beam from the second optical port to the third optical port further comprises separating the second optical beam into a first polarization and a second polarization.

46. (Currently Amended) A method of transmitting an optical beam comprising:

passing a first optical beam through a nonreciprocal optical device from a first port to a second port, the optical device comprising a first compound beam angle turner, a second compound beam angle turner and a complete gap, wherein both an e-ray and an o-ray of the first optical beam propagate through both the first beam angle turner, the second beam angle turner and the complete gap, wherein the first beam angle turner turns the first optical beam to converge towards a longitudinal axis of the nonreciprocal optical device and the second beam angle turner aligns the first optical beam with the longitudinal axis;

passing a second optical beam ~~that is separated from the first optical beam by a distance~~ through the nonreciprocal optical device from a second port to a third port, the third port being adjacent the first port, wherein the second optical beam passes through the first beam angle turner, the second beam angle turner, and the complete gap, wherein adjusting the complete gap adjusts ~~the~~ a distance between the first optical beam at the first port and the second optical beam at the third port, wherein the second beam turner turns the second optical beam away from the longitudinal axis of the nonreciprocal optical device and the first beam turner turns the second optical beam back towards the longitudinal axis of the nonreciprocal optical device; and

wherein any polarization rotators of which the nonreciprocal optical device is comprised are nonreciprocal polarization rotators.

47. (Previously Presented) The method of claim 46, wherein the first beam angle turner or second beam angle turner comprises a Rochon prism, a Wollaston prism, a modified Rochon prism, a modified Wollaston prism, or a pair of birefringent wedges separated by a complete gap.

48-49. (Canceled)

50. (Currently Amended) An optical circulator comprising:

a nonreciprocal optical device comprising a first end having a first optical port and a third optical port and a second end having a second optical port, wherein a first optical beam received through the first optical port and traveling to the second optical port is separated into an e-ray and an o-ray by a first beam splitter and wherein the e-ray and the o-ray are diverging from a longitudinal axis of the nonreciprocal optical device;

a first beam angle turner and a second beam angle turner, wherein both the e-ray and the o-ray of the optical beam propagate through both the first beam angle turner and the second beam angle turner, wherein the first angle beam angle turner ~~turns~~ <u>causes</u> the e-ray and the o-ray <u>to converge to</u> ~~towards~~ the longitudinal axis and wherein the second beam angle turner aligns the e-ray and the o-ray with the second optical port;

a beam combiner that recombines the e-ray and the o-ray into the first optical beam; and

wherein any polarization rotators of which the nonreciprocal optical device is comprised are nonreciprocal polarization rotators.

51. (Currently Amended) The optical circulator of claim 50, wherein the first beam angle turner or second beam angle turner comprises a Rochon prism, a Wollaston prism, a modified Rochon prism, a modified Wollaston prism, or a pair[[-]] of birefringent wedges separated by a complete gap.

52. (Previously Presented) The optical circulator of claim 50, wherein the optical circulator comprises a polarization mode dispersion free optical circulator.

53. (Previously Presented) The optical circulator of claim 50, further comprising a complete gap disposed between the first beam angle turner and the second beam angle turner, wherein the complete gap controls a distance between the first optical beam and a second optical beam that travels from the second optical port to a third optical port, wherein the second beam angle turner turns the second optical beam away from the longitudinal axis and the first beam angle turner turns the second optical beam towards the third optical port.

54. (Previously Presented) An optical circulator, and the optical circulator having a longitudinal axis, and the optical circulator comprising a first optical port located at an end of the optical circulator, a second optical port located at a distal end of the optical circulator from the first optical port along the longitudinal axis, the third optical port located at the same end of the optical circulator as the first optical port, and the optical circulator comprising:

a first beam angle turning means located along the longitudinal axis between the first optical port and the second optical port, for turning a beam through an angle, wherein the first beam angle turning means turns a first light beam towards the longitudinal axis and turns a second light beam such that the second light beam diverges from the longitudinal axis;

a second beam angle turning means located along the longitudinal axis distally from the first beam angle turner, for turning a beam through an angle, wherein the second beam angle turning means aligns the first light beam with the longitudinal axis and turns the second optical beam towards the longitudinal axis, and the first beam angle turning means and the second beam angle turning means being separated by a complete gap; and

wherein adjusting a length of the complete gap causes a corresponding adjustment in a spatial separation between a first light beam traveling from the first optical port to the second optical port and a second light beam traveling from the second optical port to the third optical port, wherein the location of the first light beam and the second light beam define the location of the first optical port and the third optical port.

55. (Previously Presented) The optical circulator of claim 54, wherein the first beam angle turning means or second beam angle turning means comprises a Rochon prism, a Wollaston prism, a modified Rochon prism, a modified Wollaston prism or a pair of birefringent wedges separated by a complete gap.

56. (Previously Presented) The optical circulator of claim 54, wherein each of the first beam angle turning means or second beam angle turning means comprise two or more Rochon prisms, Wollaston prisms, modified Rochon prisms, modified Wollaston prisms, or a pair of birefringent wedges separated by a complete gap.

57. (Previously Presented) The optical circulator of claim 54, wherein the optical circulator comprises a polarization mode dispersion free optical circulator.

58. (Previously Presented) The optical circulator of claim 54, wherein the optical circulator comprises four or more optical ports.

59. (Previously Presented) An optical circulator having a longitudinal axis, the optical circulator comprising a first optical port located at a proximal end of the optical circulator, a second optical port located at a distal end of the optical circulator from the first optical port along the longitudinal axis, the third optical port located at the same end of the optical circulator as the first optical port, and the optical circulator comprising:

a first compound beam angle turning means located along the longitudinal axis between the first optical port and the second optical port, for turning a beam through an angle, wherein the first compound beam angle turning means turns a first light beam towards the longitudinal axis and turns a second light beam such that the second light beam diverges from the longitudinal axis;

a second compound beam angle turning means located along the longitudinal axis distally from the first compound beam angle turner, for turning a beam through an angle, wherein the second compound beam angle turning means aligns the first light beam with the longitudinal axis and turns the second optical beam towards the longitudinal axis, and the first compound beam angle turning means and the second compound beam angle turning means being separated by a complete gap, a length of said gap being adjustable to cause a corresponding adjustment in a spatial separation between a first light beam traveling from the first optical port to the second optical port and a second light beam traveling from the second optical port to the third optical port; and

wherein the location of the first light beam and the second light beam define the location of the first optical port and the third optical port.

60. (Previously Presented) The optical circulator of claim 59, wherein the first compound beam angle turning means or second compound beam angle turning means comprises

a Rochon prism, a Wollaston prism, a modified Rochon prism, a modified Wollaston prism or a pair of birefringent wedges separated by a complete gap.

61. (Previously Presented) The optical circulator of claim 59, wherein each of the first compound beam angle turning means or second compound beam angle turning means comprise two or more Rochon prisms, Wollaston prisms, modified Rochon prisms, modified Wollaston prisms, or a pair of birefringent wedges separated by a complete gap.

62. (Previously Presented) The optical circulator of claim 59, wherein the optical circulator comprises a polarization mode dispersion free optical circulator.

63. (Previously Presented) The optical circulator of claim 59, wherein the optical circulator comprises four or more optical ports.

64. (Previously Presented) A method as defined in claim 46, wherein passing a first optical beam further comprises at least one of:

passing the first optical beam through the complete gap before passing the first optical beam through the first beam angle turner;

passing the first optical beam through the complete gap after passing the first optical beam through the first angle beam angle turner;

passing the second optical beam through the complete gap before passing the second optical beam through the second beam angle turner; and

passing the second optical beam through the complete gap after passing the second optical beam through the second beam angle turner.